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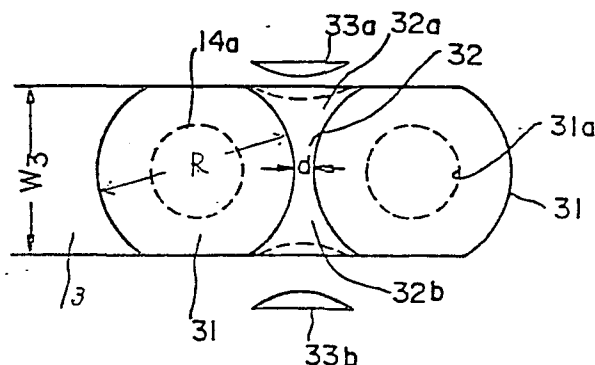
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54 **Method for preparation of a laminated iron core and laminated iron core of an electric device.**

57 A laminated iron core of an electric device is prepared by stamping a strip (3) having a width (W_3) smaller than an outer diameter of said laminated iron core to form iron core discs (31) having one or more straight edges and also to form crescent-shaped pieces (33a, 33b) from excess fragments (32) of said strip and processing said iron core discs to form iron core ring plates having straight edges and assembling said iron core ring plates and said crescent-shaped pieces (33a, 33b) to form said laminated iron core (Fig. 4).



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Method for preparation of a laminated iron core and laminated iron core of an electric device.

The present invention relates to a method for preparation of a laminated iron core and to a laminated iron core of an electric device, in particular a rotary device like an electric motor or generator, in an improvement of utilization of a strip for iron cores.

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A laminated iron core of a rotary electric device is formed by laminating a number of iron core plates obtained by stamping a strip for iron cores in a desired shape.

- 10 In a conventional method illustrated in figure 1, iron core discs 11 having an outer size $R (< W_1)$ being the same as the outer size of a stator laminated iron core, are obtained by stamping the strip 1 for iron cores having a width W_1 at a desired stamping gap d and forming a shaft hole 11a at the center of each iron core disc in an annular form and further stamping
- 15 the iron core discs to form rotor or stator slots (not shown) so as to separate them into smaller diameter ring plate and larger diameter ring plate. The smaller diameter ring plates and the larger diameter ring plates are respectively laminated to prepare a rotor laminated iron core 100 and a stator laminated iron core 200 (fig. 3).

According to fig. 2 iron core discs 21 are obtained by stamping a strip for iron cores 2 having a width $W_2(=k)$ being smaller than the outer size R of the stator laminated iron core and each shaft hole 21a and the slots are formed in the same manner.

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In accordance with the conventional methods to prepare iron core ring plates for the stator and rotor laminated iron cores by stamping iron core discs obtained by stamping a strip for iron cores in the outer size of the stator laminated iron core, excess fragments 12,22 of the strip for iron cores formed between the stamped iron core discs are
10 wasted without a reuse and accordingly, the efficiency for utilization of the strip for iron cores is disadvantageously inferior.

An object of the present invention is to overcome the aforementioned
15 disadvantages of the conventional methods.

Another object of the present invention is to provide a method for preparing a laminated iron core of an electric device, for instance a rotary electric device, e.g. an electric motor or generator, and a laminated iron core in which the strip of iron cores in comparison with that
20 of the conventional preparation are used with a remarkably higher efficiency.

The foregoing and other objects of the present invention have been
25 attained by stamping a strip having a smaller width than an outer diameter of the iron core to form iron core discs having one or more straight edges and also to form crescent-shaped pieces from the excess fragments of the strip, and assembling iron core ring plates obtained from iron core discs and the crescent-shaped pieces to form the laminated
30 iron core.

The invention may be carried into practice in various ways but certain specific embodiments will now be described by way of example only and with reference to the accompanying drawings, in which
35 fig. 1 and 2 are respectively schematic views for illustrating the conventional methods of preparing a laminated iron core;

fig. 3 is a sectional view of laminated iron cores of a rotary electric device;

fig. 4 and 5 are respectively schematic views for illustrating one embodiment of the preparation and assembly of a laminated iron core according to the present invention; and

fig. 6 and 7 are respectively schematic views for illustrating another embodiment of the preparation and assembly of a laminated iron core according to the present invention.

One embodiment of the present invention will now be described at figs. 4 and 5.

In this embodiment, a strip for iron cores 3 having a width W_3 ($< R$) as shown in fig. 4 is used in the stamping of the strip to form iron core discs for laminated iron cores of a rotary electric device which include a stator laminated iron core having an outer diameter R . The strip for iron cores 3 is stamped to form the iron core discs 31 having a modified peripheral shape having a pair of straight edges in both sides (which is different from the complete shape of the stator laminated iron core) with each stamping gap d being the same as the conventional stamping gap as shown in fig. 1. That is, the strip is stamped to form the iron core discs 31 having a pair of straight edges at the position of $1/2 W_3$ from the center of the circular disc having a diameter R symmetrically to the center line. At the same time for the stamping of the iron core discs 31 or after the stamping, crescent-shaped pieces 33a, 33b are obtained by stamping the excess fragments 32 of the strip 3 for iron cores which are formed by the stamping for the iron cores. The crescent-shaped pieces 33a, 33b are formed by stamping as shown by the dotted lines so as to include the side edge of the strip as the straight edge of each side parts 32a, 32b of the excess fragment 32 in the shape of $\cap$.

Each shaft hole 31a shown in fig. 4 is formed by stamping each iron core disc 31 by the conventional manner and then, rotor slots and stator slots (not shown) are formed by stamping the iron core disc to separate it into a rotor iron ring plate 311 having a smaller

diameter and a stator iron core ring plate 312 having a larger diameter. The stator iron core ring plates 312 and the crescent-shaped pieces 33a, 33b are assembled by the lamination. The assembly is shown in fig. 5. The crescent-shaped pieces 33a, 33b are fixed by fastening
5 force after inserting into the laminated layers without a bonding.

Fig. 6 shows the other embodiment of the present invention. In this embodiment, the strip is stamped to form iron core discs 41 having two pairs of four straight edges (two straight edges are further formed on
10 the iron core disc 31 shown in fig. 4 at the adjacent sides) and both side parts 42a, 42b of excess fragments 42 are stamped to form crescent-shaped pieces 43a, 43a, 43b, 43b.

Each shaft hole 41a shown in fig. 7 is formed on each iron core disc
15 41 and rotor slots and stator slots are formed by stamping to separate it into a rotor iron core ring plate and a stator iron core ring plate. The stator iron core ring plates 412 and the crescent-shaped pieces 33a, 33b, 43a, 43a, 43b, 43b are assembled by the lamination in the same manner. The assembly is shown in fig. 7.

20 In this embodiment, the width W of the iron core disc (in the longitudinal direction) in the stamping to form the iron core disc 41 can be smaller than that of the iron core disc 11, 12 shown in fig. 1 and 2 and that of the iron core disc 31 shown in fig. 4. The half-crescent-shaped pieces 43a, 43a, 43b, 43b can be obtained by stamping the broad
25 parts 42a, 42b of the excess fragment 42 in the form of each pair of half-crescent-shaped pieces having the common straight edge. Therefore, the efficiency for utilization of the strip for iron cores is further improved.

30 In accordance with the present invention, a strip having smaller width can be used and excess fragments wasted in the conventional preparation can be utilized to improve the efficiency for utilization of the strip for iron cores and the cost for preparation of laminated iron core
35 can be remarkably reduced in comparison with the conventional preparation and a laminated iron core having an outer diameter larger than the width of the strip for iron cores can be obtained.

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- 5 -

Claims

1. Method for preparation of a laminated iron core of an electric device, characterized by stamping a strip having a width smaller than an outer diameter of said laminated iron core to form iron core discs having one or more straight edges and also to form
5 crescent-shaped pieces from excess fragments of said strip and by processing said iron core discs to form iron core ring plates having straight edges and assembling said iron core ring plates and said crescent-shaped pieces to form said laminated iron core.
- 10 2. Method according to claim 1, characterized in that said iron core ring plate is prepared by stamping said iron disc having a straight edge to form slots.
3. Method according to claim 1, characterized in that a pair of straight
15 edges are formed on said iron core disc (fig. 4,5).
4. Method according to claim 1, characterized in that two pairs of straight edges are formed on said iron core disc (fig. 6,7).
- 20 5. Method according to one of claims 1 to 4, characterized in that said crescent-shaped pieces are formed in a half-crescent-shape.
6. A laminated iron core of an electric device comprising iron core discs stamped out of a strip, characterized in that each iron

core disc is composed of a ring plate (31;41) and crescent-shaped pieces (33a,33b;43a,43b) stamped out of an excess fragment (32;42) of said strip and fixed to said ring plate.

- 5 7. A laminated iron core according to claim 6, characterized in that said crescent-shaped pieces (33a,33b;43a,43b) are fixed to said ring plate by a fastening force without bonding.

Fig. 1

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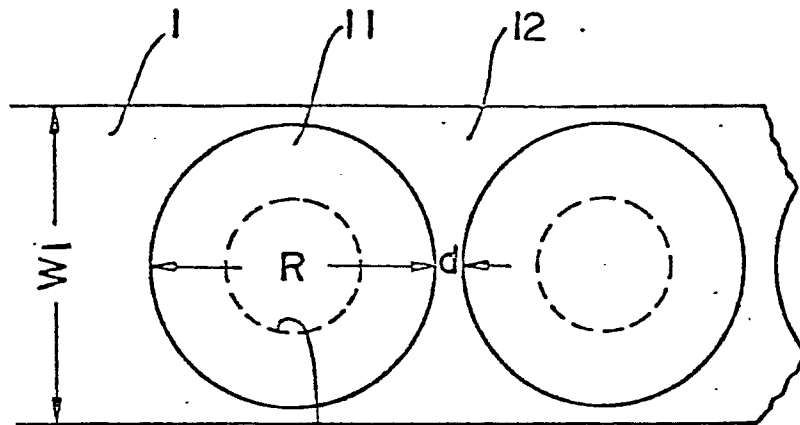


Fig. 4

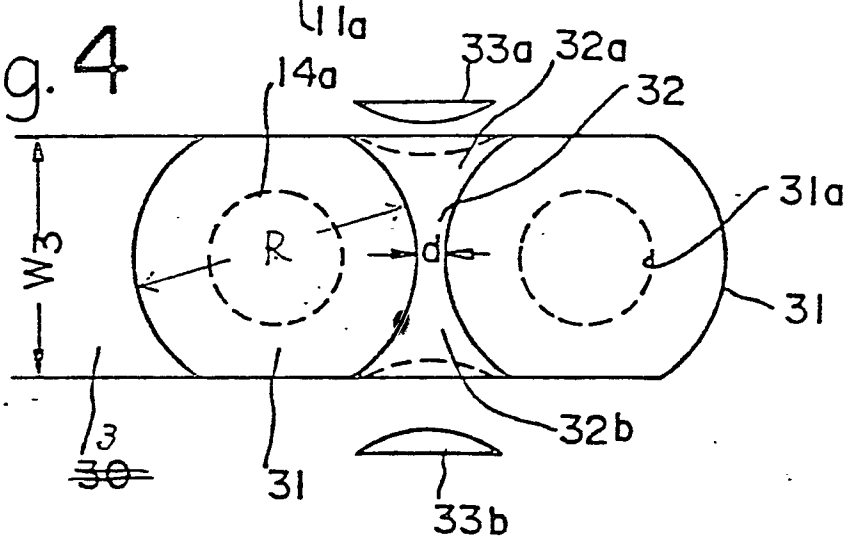


Fig. 5

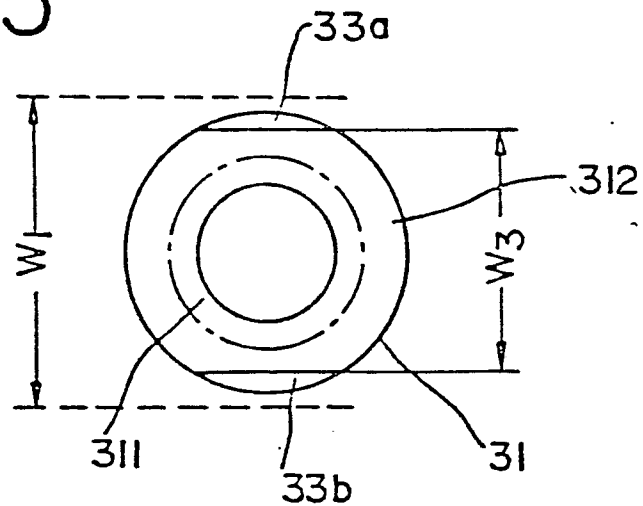


Fig. 3

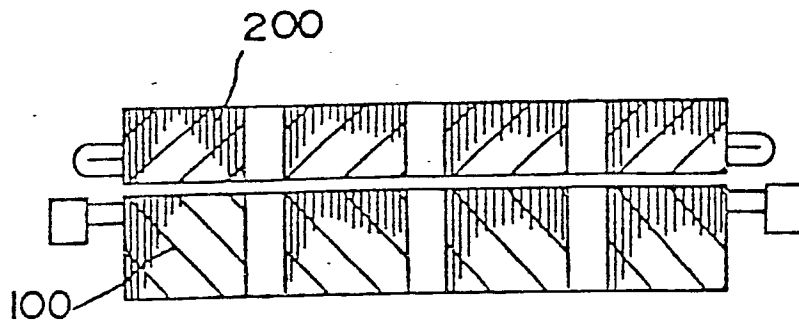


Fig. 2

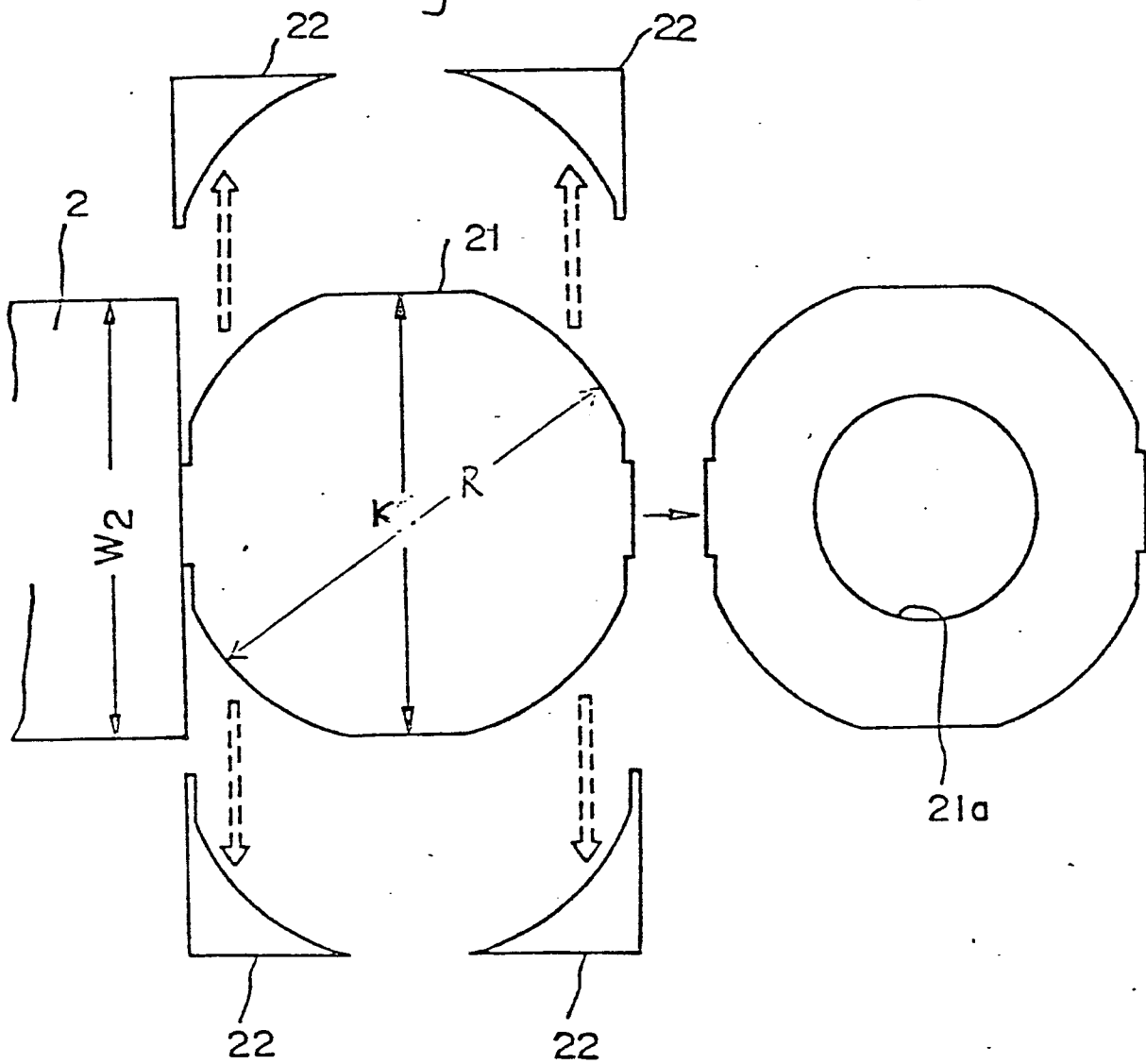


Fig. 6

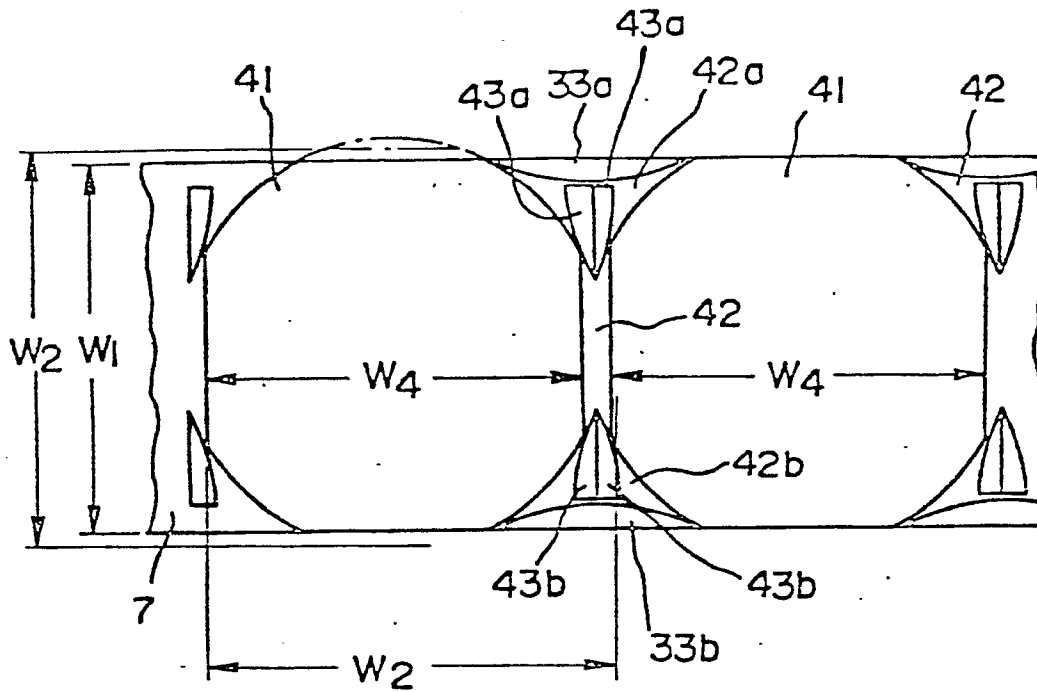


Fig. 7

